REMARKS

The Application has been carefully reviewed in light of the Office Action dated April 24, 2002 (Paper No. 10). Claims 1 to 35 are in the application, of which Claims 1, 8, 15, 22, and 29 are the independent claims. Claims 31 to 35 have been added herein. Reconsideration and further examination are respectfully requested.

Claims 1, 3, 5 to 8, 10, 12 to 15, 17, 19 to 22, 24 and 26 to 30 have been rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 5,721,572 (Wan '572), Claims 2, 9, 16 and 23 have been rejected under 35 U.S.C. § 103(a) over Wan '572 and U.S. Patent No. 5,553,199 (Spaulding), and Claims 4, 11, 18 and 25 have been rejected under 35 U.S.C. § 103(a) over Wan 572 and U.S. Patent No. 5,625,378 (Wan '378).

The Office Action states, at page 2, that Wan '572 at col. 4, lines 15 through 17 describes generating an ILUT. The Office Action further states, at page 3, that it is agreed that Wan '572 describes generating gamut boundary descriptors and that gamut boundary descriptors are not the same as a reverse model look-up table. However, the Office Action states, at page 3, that:

> "one of ordinary skill in the art can interpret Wan ['572] as disclosing a method for deriving a reverse model look-up table by first deriving the gamut descriptors, which then are used to derive the inverse look-up table."

While Wan '572 may include a general reference to deriving a reverse model look-up table using gamut boundary descriptors, Wan '572 is not seen to teach or to suggest a specific technique of generating a reverse model look-up table, and is certainly

not seen to teach or to suggest generating a reverse model look-up table as recited in the claims of the present Application. In addition and as is discussed in detail below, it is believed that the 35 U.S.C. § 102(e) rejection of the claims is technically and legally deficient, and withdrawal of the rejection is respectfully requested.

More particularly and with specific reference to the language of the claims, Claim 1 describes a method for deriving a reverse model look-up table whose entries represent device dependent colors as a function of device independent colors, based on a forward model look-up table whose entries represent device independent colors obtained in response to printout of corresponding device dependent color components, wherein the forward model and the reverse model look-up tables both comprise a grid of cells in their respective color spaces with entries at each grid point of the grid, the method comprising the following steps to determine an entry in the reverse model look-up table for a device independent target color. A binary search of the forward model look-up table is performed to locate a cell of the forward model look-up table that contains the device independent target color. Entries at grid points of the forward model look-up table that define the cell located by the binary search are interpolated to obtain device dependent colors that correspond to the device independent target color. The device dependent color is stored at a grid point in the reverse model look-up table for the device independent target color.

Wan '572 is not seen to teach or to suggest the above-described features of deriving a reverse model look-up table. More particularly, Wan '572 is not seen to teach or suggest performing a binary search of the forward model look-up table to locate a cell of the forward model look-up table that contains the device independent target color, and/or

interpolating entries at grid points of the forward model look-up table that define the cell located by the binary search to obtain device dependent colors that correspond to the device independent target color.

Generally, the portions of Wan '572 cited in the Office Action are seen to describe generating gamut boundary descriptors by first generating a table of triangles that define the boundary of the gamut, together with tables that can be used to facilitate identification of one of these triangles given a target point.

With respect to binary search of a forward model look-up table to locate a cell of the forward model look-up table that contains the device independent target color, the Office Action, at page 5, indicates that col. 7, line 24 to col. 8, line 37 and col. 9, lines 9 to 16 of Wan '572 describes a binary search of a forward model look-up table. These cited portions of Wan '572 are seen to describe the tables and the techniques that are used to generate gamut boundary descriptors, and are not seen to teach or to suggest the generation of a reverse model look-up table. In addition, none of the tables in the cited portions of Wan '572 are seen to be a forward model look-up table that is searched using a binary search to locate a cell of the forward model look-up table that contains the device independent target color.

More particularly, Tables I, II and III of Wan '572 are not seen to be a forward model look-up table. Further, nothing in Wan '572, and in particular the cited portions of Wan '572, is seen to teach or to suggest a binary search of any table. Finally and since Wan '572 is not seen to teach or to suggest a binary search of a forward model look-up table, Wan '572 is not seen to teach or to suggest interpolating entries at grid

points of the forward model look-up table that define the cell located by the binary search to obtain device dependent colors that correspond to the device independent target color.

With respect to Table I, Wan '572 at col. 6, lines 23 to 67 and col. 7, lines 18 to 23, is seen to describe a method of generating Table 1, which is a table of triangles representing the surface of the gamut boundary. Each entry in the table identifies the vertices of a triangle in CMY space and in Lab space. Referring to Figure 7, each square on the surface of the cube in CMY space is divided into a triangle, and each triangle in CMY has a corresponding triangle in Lab space (see Figure 8). Accordingly, Table I is a table of triangles that represent the boundary of the gamut, and is not seen to be a forward model look-up table.

At col. 7, lines 24 to 50, Wan '572 is seen to describe a technique for geometrically determining whether a device independent color is within the gamut using the triangles defined by Table I and the intersection between a line and the surface of one of the triangles, which is located by solving a set of linear equations with vectors. See col. 9, lines 9 to 16 and Figure 15. Specifically and with reference to Figure 9, a determination is made whether the length of the line from the "L" axis to the surface of the located triangle is less than the length of the line from the "L" axis to the target point. These geometric determinations performed by Wan '572 to determine whether a target point in device-independent space is within gamut are not seen to teach or to suggest a binary search, and is not seen to teach or to suggest a binary search of a forward model look-up table.

Table III, at col. 9, lines 17 to 30 of Wan '572, is seen to facilitate the identification of a triangle to be used in the geometric determination described above. More particularly, each entry in Table III associates a triangle with a range of values along the "L" axis. Given an "L" value associated with the vector derived using equation 8, at col. 7, line 30 of Wan '572, a triangle can be located based on the ranges identified in Table III. Table III is not seen to be a forward model look-up table and the description at col. 9, lines 9 to 330 of Wan '572 is not seen to teach or to suggest a binary search of a forward model look-up table.

Finally and at col. 7, line 51 to col. 8, line 37, Wan '572 is seen to describe constructing the gamut boundary descriptors, which are stored in Table II. Gamut boundary descriptors describe the boundary of the gamut and are not seen to be a forward model look-up table.

Accordingly and based on the above discussion, Wan '572 is not seen to teach or to suggest interpolating entries at grid points of the forward model look-up table that define the cell located by the binary search of the forward model look-up table to obtain device dependent colors that correspond to the device independent target color, as recited in Claim 1.

Further, since Wan '572 is only seen to describe generating gamut boundary descriptors, and with the exception of the brief reference at col. 4, lines 17 to 26, the portions of Wan '572 are directed to the generation of these gamut boundary descriptors, which the Office Action indicates are not the same as a reverse model look-up table, it is believed that the cited portions fail to teach each and every element of Claim 1, which

recites a method of generating a reverse model look-up table. Accordingly, the 35 U.S.C. § 102(e) rejection of the claims is believed to be deficient on both technical and legal grounds, and reconsideration and withdrawal of the rejection is respectfully requested.

Finally, Applicants submit herewith an Information Disclosure Statement to formally make of record abandoned Application Serial Nos. 08/068941 (Application '941) and 08/068887 (Application '887) referenced in Wan '572.

Neither of these references is seen to teach or to suggest the method of generating a reverse model look-up table as recited in Claim 1. More particularly, these references are not seen to teach or to suggest performing a binary search of the forward model look-up table to locate a cell of the forward model look-up table that contains the device independent target color, and/or interpolating entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color.

Application '887, from which Wan '572 is a continuation-in-part, has been reviewed and is seen to describe creating gamut boundary descriptors, as in Wan '572. That is, like Wan '572, Application '887 is seen to be directed to the generation of gamut boundary descriptors, which are not considered to be the same as a reverse model look-up table, as admitted in the Office Action. Accordingly, Application '887 is also not seen to teach or to suggest performing a binary search of the forward model look-up table to locate a cell of the forward model look-up table that contains the device independent target color, and/or interpolating entries from the forward model look-up table at grid points that define

the cell so as to obtain device dependent colors corresponding to the device independent target color.

The Office Action cites Wan '572 at col. 4, lines 17 to 26, which refers to Application '941 for the details of generating a reverse look-up table using gamut descriptors. Application '941 has been carefully reviewed and is not seen to teach or to suggest performing a binary search of the forward model look-up table to locate a cell of the forward model look-up table that contains the device independent target color, and/or interpolating entries from the forward model look-up table at grid points that define the cell so as to obtain device dependent colors corresponding to the device independent target color.

Applicant points out that while Application '941 describes using a binary search, the binary search described in Application '941 is not seen to be a binary search of a forward model look-up table used to locate a cell in the forward model look-up table that contains the device independent target color. The binary search described in Application '941 is seen to be a binary search to map an "out-of-gamut point to the boundary of the gamut. More particularly, the binary search that is discussed at page 5, lines 6 to 11 of Application '941 is seen to identify an in-gamut point in device-independent color space. Accordingly, the binary search discussed at page 5, lines 6 to 11 of Application '941 is not seen to teach or to suggest a binary search of a forward model look-up table that locates a cell in the forward model look-up table that contains the device-independent target color.

At page 11, lines 19 to 28, Application '941 discusses performing a binary search of angles associated with gamut descriptors. A binary search of angles is also not

seen to teach or to suggest a binary search of a forward model look-up table to locate a cell in the forward model look-up table that contains a device-independent target color.

Accordingly, Application '941 is not seen to teach or to suggest performing a binary search of the forward model look-up table to locate a cell of the forward model look-up table that contains the device independent target color.

Turning now to the particular technique used in Application '941 for generating a reverse look-up table, Application '941 is seen to test to determine whether a point in device-independent color space is with gamut and then to perform a backward interpolation to generate a device-dependent color. The technique described in Application '941 is not seen to teach or to suggest the method of generating an inverse look-up table as in Claim 1 of the present Application.

Referring to Figures 7 and 8 and page 10, line 2 to page 12, line 29 of Application '941, block 78 of Figure 7 determines whether a device-independent point is within gamut by calculating distances using sum-of-the-squares equations. If the device-independent point is determined to be within gamut, backward interpolation is performed to determine a point in device-dependent color space. See page 12, lines 10 to 13 of Application '941. As stated in Application '941 at page 3, lines 36, backward interpolation is used to compute, for any given point in device-independent color space a corresponding point in device-dependent color space.

Accordingly, the technique for generating a reverse model look-up table described in Application '941 is not seen to involve a binary search of a forward model look-up table in order to locate a cell that contains a device-independent color, and or to

involve interpolating entries at grid points of a forward model look-up table that define the cell located by a binary search of the forward model look-up table in order to obtain device dependent colors that correspond to the device independent target color as in Claim 1 of the present Application.

Accordingly, Application '887 and '941 are seen to further support a determination that the 35 U.S.C. § 102(e) rejection of the claims based on Wan '572 is technically and legally deficient, since like Wan '572, Applications '887 and '941 are not seen to teach or to suggest performing a binary search of a forward model look-up table to locate a cell in the forward model look-up table that contains the device independent target color, and/or interpolating entries at grid points of the forward model look-up table that define the cell located by the binary search to obtain device dependent colors that correspond to the device independent target color, and storing the device dependent color at a grid point in the reverse model look-up table for the device independent target color.

Therefore, for at least the foregoing reasons, Claim 1 is believed to be in condition for allowance. Further, Applicants submit that Claims 8, 15, 22 and 29 are believed to be in condition for allowance for at least the same reasons.

The remaining claims are each dependent from the independent claims discussed above and are therefore believed patentable for the same reasons. Because each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

With regard to new Claims 31 to 35, Applicant submits that none of the art of record is seen to teach or to suggest interpolating entries from the forward model look-

up table such that device-dependent colors are interpolated to obtain a device-dependent color corresponding to the device-independent target color.

In view of the foregoing, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

CONCLUSION

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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